



Final Minutes

of the

BSHC CDWG8 Meeting on 23-24 February 2016

at the Finnish Transport Agency
Helsinki, Finland

[By 19 April 2016]

1. Welcome and formalities

The meeting convened on 23 February 9:00 a.m. The chair welcomed all the participants to the meeting and gave a brief overview of the program for the meeting. [\[Program\]](#)

The Hydrographer of Finland, Mr Rainer Mustaniemi and the Head of Hydrographic Surveys Data Management -unit, Mrs Maarit Mikkelsen gave a warm welcome at the beginning of the meeting. Both pointed out the importance of the CDWG work on harmonizing the vertical reference systems in the Baltic Sea region. Harmonized vertical reference systems will benefit many user groups because there will then be no need to do any transformations between different countries. At the same time harmonized vertical reference will benefit the usage of digital services and upcoming IHO S-100 based standards.

Since CDWG doesn't have appointed secretary, *chair* proposed *Dr Wilfried Ellmer* as a secretary for the meeting helping *chair* to keep the minutes. *Dr Wilfried Ellmer* was appointed as a secretary for the meeting.

The draft agenda was adopted without any amendments. [\[Draft Agenda\]](#)

Chair noted following matters to be important at this meeting:

- review the draft definition for the Baltic Sea Chart Datum 2000 (CDWG7 action number 5)
- cooperation and communication with BOOS
- review the national implementation plans and status

Participants introduced themselves briefly. [\[List of participants\]](#)

PhD Joanna Gerlings from the Danish Geodata Agency (Geodatastyrelsen, GST) was welcomed as a new member of the working group.

Apologies were received from *Thomas Hammarklint*, *Lars Jakobsson* and *Mirjam Bilker-Koivula* since they were not able to participate.

Mr Pasi Häkli from National Land Survey (NLS), Finnish Geospatial Research Institute represented NLS instead of Mrs Mirjam Bilker-Koivula at this meeting.

The meeting took reservation by Russian Federation delegate concerning the decisions of CDWG8 meeting. The decision on all items would be taken after Russia receives draft minutes of the meeting and further discussions and necessary consultations with Head Department of Navigation and Oceanography (DNO) has been done. After receiving the draft minutes, the Department of Navigation and Oceanography of the Ministry of Defense of the Russian Federation informed to agree with the CDWG8 Draft Minutes and Draft List of Actions. The letter of agreement signed by *Captain Oleg Osipov*, the Deputy Head of DNO, follows as an Appendix 1.

2. Review the work of the CDWG and actions since the last meeting

The chair reviewed shortly the final minutes of the last meeting, CDWG7 on 11-12 February 2015. Minutes were approved without any comments. [*CDWG7 Final Minutes 11-12 Feb 2015*]

CDWG7 status of actions were reviewed and approved. Mostly all action were done. One action decided transfer to the list of actions of CDWG8 (**Action #1**). [*CDWG7_List of Actions*]

Presentations concerning harmonizing of vertical datums in the Baltic Sea were given in following conferences:

- EUREF (International Association of Geodesy, Reference Frame Sub-Commission for Europe) Technical Working Group, 1 June 2015, Leipzig
- EUREF Symposium, Tutorial "Height Gravity", 2 June 2015, Leipzig
- EUREF Symposium, 3 June 2015, Leipzig
- BOOS Annual Meeting, 5-7 May 2015, Norrköping
- FAMOS Freja mid-term meeting, 2-3 February 2016, Malmö

Outcome of BSHC20 Conference, 16-18 September 2015, St. Petersburg. Minutes and action list of the conference were not published at the time of the CDWG8 meeting. Thus any official information could not be provided during the meeting. At the meeting discussions of the BSHC20 Conference were reviewed. Two CDWG8 participants have been in the BSHC20 conference and *the chair* has contacted the chair of BSHC. Based on the discussions following notes were made:

- CDWG TORs and WP 2015-2016 were approved by BSHC20 Conference.
- CDWG proposal for displaying the name *Baltic Sea Chart Datum 2000* in ENC's and paper charts (tasked from BSHC19, action number 4) was supported with a note that in paper charts the *NATIONAL REALIZATION NAME* is not mandatory to use.

BSHC20 required from CDWG following two actions: [*Note: Because BSHC20 action list was not published at the time of CDWG8 meeting the chair asked BSHC chair to send the action list. The action list was received by email on 21 January 2016.*]

- BSHC20 action number 6: To study and clarify use of national naming of chart datum on chart.
- BSHC20 action number 7: CDWG to clarify the use of the common name of Baltic harmonized Chart Datum ("Baltic Sea Chart Datum 2000"). [*Note: BSHC20 action number 7 is equal than BSHC19 action number 4 where CDWG has answered to BSHC20.*]

The Russian federation delegate, who was present at the BSHC20 Conference informed the participants of CDWG8 meeting that the indicated action list was not officially approved by BSHC20 and that the only way to proceed is to send the corresponding questionnaires to member states concerning the actions.

Following actions concerning tasks from BSHC20 were agreed at the meeting:

- BSHC20 action number 6:
The chair shall make a questionnaire to member states concerning the national naming of chart datum on chart.
- BSHC20 action number 7:
Taking into account the BSHC20 Conference note that in paper charts the *national realization name* is not mandatory, CDWG8 agreed to give a following clarification to BSHC21 for the use of Baltic Sea Chart Datum 2000:

*In Paper Charts Baltic Sea Chart Datum 2000 should be displayed as:
Mean Sea Level (Baltic Sea Chart Datum 2000^{NATIONAL REALIZATION NAME})*

or

Mean Sea Level (Baltic Sea Chart Datum 2000)

In S-57 ENCs Verdat value 3 should be used.

Jonas Ågren shortly reviewed FAMOS-project and status of activity 2, which is tightly connected to the work of CDWG.

Definition for the Baltic Sea Chart Datum 2000. CDWG7 action number 5 was to make a draft definition document for Baltic Sea Chart Datum 2000. The draft was made by Jonas Ågren, Gunter Liebsch and Jyrki Mononen. Jonas Ågren and Gunter Liebsch presented the draft definition. The definition consists of three main sections: definition, realization and comments and remarks. Because definition is only one part it was decided that the whole document will be called a *specification* of Baltic Sea Chart Datum 2000. It was noted that ETRS89 is also included in the definition-section, because tectonic plates are moving and GNSS-observations has to be tied to a certain epoch. Land uplift epoch has to be specified because it has not been explicitly defined in EVRS. After the discussion following conclusions were agreed:

- Specification is essential document for applying and realizing the Baltic Sea Chart Datum 2000.
- Specification can be applied in all member states.
- Specification should be used in national Hydrographic Offices as guidelines for utilizing national GNSS reference station networks as national realization of the Baltic Sea Chart Datum 2000. If using other GNSS reference station services, national HO's should check that they are according to the specification (**Action #3**).
- Have to be taken into account that vertical datum in Russian Federation and Poland differs from the specification. The differences Russian and Polish datum and Baltic Sea Chart Datum 2000 can be determined.
- The specification document should not be closed/fixed until FAMOS has been finalized in 2020 to update it based on the questions arising during geoid model calculations.

During the discussion some amendments were proposed concerning mainly the figures of the specification. In section, 2. Realization, item d) the expression "*an accuracy*" should be change to "*agreement*". In Fig. 3, there should be added a note that near the coastline the numbers might not be accurate. It was noted that in Fig. 4, there should be added information from all the member states showing the difference of Mean Sea Level respect to chart datum in mareographs (**Action #2**).

In addition also following actions were agreed:

Action #4: Actualize Specification BSCD2000 (including title).

Action #5: Add Specification BSCD2000 to report to BSHC21.

3. Cooperation and communication with BOOS

BOOS activities were not presented because BOOS representative could not participate on the meeting.

Possible measures and goals for cooperation were discussed. *The chair* proposed that a possibility to tighten cooperation and finding mutual goals, could be a workshop together with CDWG and BOOS. The aim of the cooperation is to make sure that all information (reference of nautical publications and water level data) is referred to the same datum. It was agreed that *the chair* contacts the chair of BOOS and asks his opinion about a workshop or common session (Action #6).

4. Review the *national* implementation plans

Participants presented the national implementation plans.

In Estonia, the transition period is ongoing. Estonian Land Board has finalized levelling for national height system. Future actions will be planned during 2016. All data in depth database is ready to be transformed to new vertical datum. Waiting for final results of national height network levelling. Some issues are expected while publishing charts in the new vertical datum, e.g. many changes in depth curves, especially in shallow and flat areas, and changes in coastline.

In Russian Federation any actions, plans and schedules will be discussed and done after the implementation of the new State coordinate system of the Russian Federation. This will not happen earlier than 2017.

Denmark is already in practice close to the harmonized vertical reference.

In Latvia the new national height system has been taken into use in 2015 for land surveys. For hydrography, navigation and other maritime purposes mostly BAS77 is still used. The differences between BAS77 and Baltic Sea Chart Datum 2000 can be examined by web-application (<http://kartes.lgia.gov.lv/karte/>). The difference between BAS77 and Baltic Sea Chart Datum 2000 in coastal areas is 15 - 17 cm. Improving the geoid model for the Baltic Sea could give some changes to the differences, but changes are not assumed to be essential. Paper charts are printed on demand and it is possible to print out charts in both datums using specific software. For each paper chart referred to BAS77 is given a correction value for depth reduction to LAS2000.5. Correction changes between 15 to 17 cm depending on the location. Some updates to national legislation needs to be done.

In Sweden Gävle approach and some ENC's have been published in RH2000 in the Bay of Bothnia. Depth database has been transformed. This work is part of the "Chart Improvement Project" which is included in the Swedish HO "Vision 2020". The goal for the Chart Improvement Project is that the vertical reference and coastline will be updated and referenced to RH2000 (the zero level) in all Swedish charts, except those covering inland waters, before the end of 2021. All hydrographic surveys since 1 July 2013 are referred to RH2000. All water level stations have been connected to RH2000.

In Germany EVRS realization is already used in practice. The database refers to national height system (German realization of EVRS), hence there is no need for transformation. Almost all vertical positioning of hydrographic surveys is based on GNSS and geoid model. Gravity surveys are done and will be continuing within FAMOS to improve the geoid model.

In Finland the project to study and plan how the transition to harmonized vertical reference will be executed was started in 2015. The final report and recommendations will be ready during spring 2016. Finnish national height system N2000 is in use in land applications. All mareographs have been connected to N2000-height system. Water level information is available in N2000. The differences between N2000 and MSL are available by Finnish Meteorological Institute (<http://en.ilmatieteenlaitos.fi/theoretical-mean-sea-level>). Hydrographic surveys have been referred to N2000 since 2013.

Based on replies, it can be summarized that all answered member states have been executing actions to implement EVRS-based vertical datum, although there are differences in degree of readiness of implementation plan and schedule.

5. Review and update the *joint* road map, time line and communication plan

The chair gave a brief overview of the joint roadmap and timeline. There was no need for any major changes. FAMOS was deemed to be important project to add to time line and change "user communication" to "communication" without user.

[CDWG6 5-6 Feb 2014, RoadMap_Draft_ver03.pdf]

[CDWG6 5-6 Feb 2014, RoadMap_TimeLine_ver03.pptx]

CDWG members are asked to propose updates to the list of relevant conferences, other meetings and potential participation of CDWG members. Proposals are asked to be send to the *chair* by email. Some amendments were done during the meeting. [List of relevant meetings to CDWG.pdf]

In following actions was agreed:

Action #7: Update questionnaire (implementation status with used GNSS augmentation service) and distribute it to MS.

Action #8: Participate at BSHC21, and ask Poland and Lithuania for their actual status of the implementation.

Action #9: Prepare a poster about BSCD2000 and the contribution of FAMOS activity 2.

6. CDWG work programme for 2016-2017

Chair reviewed the Work Programme 2015-2016 [CDWG WorkProgramme_2015-2016Feb2015] as a basis for WP 2016-2017.

It was noted that item 1a has been done in WP 2015-2016 and can be removed. It was agreed that a new item 1c will be added: "*To propagate and explain the idea of harmonized chart datum*". It was agreed to change item 4 by also including promoting studies and further development dynamic topography with FAMOS. It was agreed to change item 5 to promote improving precise real-time GNSS navigation within FAMOS. With these changes the WP 2016-2017 was approved.

Chair reviewed the existing TORs [ChartDatumWG TORs 12Feb2015]. It was noted that TORs are still valid and up-to-date. It was agreed that no changes are needed to TORs.

Terms of References and amended Work Programme 2016-2017 will be presented to BSHC21 for approval. [ChartDatumWG TORs 24Feb2016], [CDWG Work Programme 2016-2017 24Feb2016]

E.g. following matters should be reported to the BSHC21th Conference, Klaipeda, Lithuania, 27-29 September 2016:

- Specification of the Baltic Sea Chart Datum 2000.
- A report of the results of CDWG work for information including answer to questions arising in BSHC20 final minutes (**Action #10**).
- BSHC will be invited to give further guidance to CDWG as seen appropriate.
- CDWG TORs for endorsement.
- Amended Work Programme 2016-2017 for endorsement.
- To emphasize the importance that all member states should send representatives to the CDWG meeting.
- Cooperation with FAMOS.

The chair will forward the draft of CDWG report to BSHC21 to CDWG Members for comments and all should comment on the draft (**Action #11**). The chair will send the final

Report to CDWG members and to BSHC21 within the conference documents deadline (Action #12).

7. Future work of CDWG

CDWG list of members was updated during the meeting. All members were asked to check the CDWG national representatives and contact information. List of members will be provided together with the meeting documents. Corrections were asked to be sent by email to *chair* (jyrki.mononen@liikennevirasto.fi). (Action #13) [CDWG List of Members 24Feb2016]

At this moment CDWG do not have an appointed secretary. *The Chair* emphasized that it is important for the efficiency of the CDWG to have a secretary for the working group. *The chair* asked all the members to propose secretary candidates before the next meeting. (Action #14)

The chair raised up the question of next chairman. After the discussion, Sweden was tasked to find out if they have a possible candidate for the position as chairman. (Action #15).

TWCWG1 (Tides, Water Level and Currents Working Group) Niterói, Brazil (25-29 April 2016) documents can be found on IHO Web pages: [TWCWG1 documents] The most important item deemed to be that the amended resolution 3/1919 should come to force (Action #16). Draft proposal submitted by the TWLWG to HSSC-7, redline version identifying the changes to the draft endorsed by HSSC-6 (see Annex A to IHO CL 17/2014) (see IHO web-page: http://iho.int/mtg_docs/com_wg/HSSC/HSSC7/HSSC7-05.8C_Comments-on-TWLWG-Report.pdf).

It was discussed if Latvia would be interested to participate to FAMOS activity 2 during FAMOS Odin 2019-2020 (Action #17).

8. Any Other Business

The chair has asked the BSHC web-master to add CDWG meeting minutes and other information to the BSHC web-pages. TORs, Work Programme, members, agenda and minutes of the meeting will be included to the BSHC web-pages. (Action #18) (<http://www.bshc.pro/>)

Estonia presented web-service for displaying Estonian Maritime Administration's official ENC's and base map from Estonian Land Board. Furthermore other data layers from hydrographic information system can be displayed (<http://gis.vta.ee/smartsea/>).

Latvia presented web-service for displaying amongst others maps, geodetic and height networks, gravimetric networks and differences of BAS77 to Latvian realization of EVRS. (<http://kartes.lgja.gov.lv/karte/>)

9. Review of actions and unresolved issues of this meeting

The list of actions was reviewed and completed. [CDWG8_List of Actions]

10. Next meeting

It was agreed that the next meeting will be held in Rostock. The time for the next meeting was proposed to be either first or last week of April 2017. *The chair* will propose the exact dates for the meeting.

11. Closing of the meeting

Chair thanked all participants for their active contribution. The meeting was closed on 24th of February at 14:20.
